Educational Activities in Tennessee on Water Use and Control—Agricultural Phases

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The major portion of the educational work on water use and control in Tennessee during recent years has been in connection with: (1) TVA programs initiated in 1934, and (2) recent interest in state water use and control legislation. Educational activities associated with TVA programs illustrate procedures developed by the Authority and cooperating agencies *under established legislation* in designing and executing operating programs jointly with affected citizen groups. Work in connection with state water control legislation illustrates educational effort *prior to formulation of legislation.*

GENERAL POLICIES AND PROGRAMS AFFECTING LOCAL AREAS

TVA has consistently followed a policy of collaboration with established agencies in programs of mutual interest, rather than that of setting up independent programs of its own. Under this policy TVA has utilized the educational services of the College of Agriculture of the University of Tennessee under contractual arrangements whereby the college has been provided with additional personnel to work on problems of water use and control. In this way the regular program of the Extension Service has been broadened to include activities to deal with problems stemming from TVA programs and to make effective use of new facilities provided by TVA.

Educational work in water use and control by the Agricultural Extension Service in cooperation with TVA has been concerned with three interrelated TVA activities: (1) acquisition of land for reservoir purposes on the Tennessee River and major tributaries, (2) soil and water conservation on the land in the Tennessee River watershed, and (3) problems of small watersheds.

Among the problems created by TVA land acquisition were permanent removal of agricultural land by flooding; relocation of families and the problems of their readjustment in different farming areas; relocation of roads, railroads, and towns; and substantial loss of agricultural income in reservoir counties. The construction of 14 dams and the flooding of reservoirs was a serious problem to those families and communities directly concerned. Major decisions affecting their welfare for years ahead had to be made. Educational work by the College was directed toward assisting groups and families in understanding general policy and making rational decisions with

regard to cooperatively developed programs (assistance in relocating, licensing of reservoir land, readjustment activities, and the like). This type of education reduced the need for coercive action by TVA in dealing with people who had to make major adjustments in response to TVA activities. For example, in purchasing 320,244 acres of land and land rights for the Kentucky Dam project, only 2.4 percent was acquired by condemnation.

Educational work in assisting families and communities with readjustment problems was partially responsible for a change in TVA land acquisition policy. In acquiring land for the first reservoir (Norris), TVA purchased some 121,000 acres in fee in excess of that actually needed for reservoir purposes. Subsequently, in other reservoirs (particularly in the Kentucky reservoir) policy was changed, and the maximum amount of land was left in private hands through reducing the amount bought in fee simple and purchasing flowage easements to permit TVA to flood the land during the period when crops are not normally grown. Where flowage easements were purchased the original owners retained the agricultural use of the land. This change in land acquisition policy reduced considerably the number of people who were forced to relocate, but increased the need for educational work with those who remained.

EXAMPLE OF EDUCATIONAL ACTIVITIES IN CONNECTION WITH LAND ACQUISITION

Big Sandy and its trade area represent one of the communities seriously affected by the acquisition of land for the Kentucky reservoir. Of the total 320,244 acres of land and land rights purchased for the Kentucky Reservoir, some 11,300 acres were located in the Big Sandy trade area. In keeping with its policy of collaboration with existing agencies and the policy followed in other reservoirs, TVA contracted with the University of Tennessee for the Agricultural Extension Service to help families and communities to relocate and adjust to new situations. Although the problems differed from community to community, the Big Sandy area illustrates the general approach taken in working with communities affected by the acquisition of land for reservoirs.

Big Sandy, a town of 650 people in 1940, is situated in Benton County, Tennessee, on the east side of the Big Sandy River, a major tributary of the Tennessee. In 1940, the town was a trade center for an agricultural area of some 83,000 acres. The 191 families in the town were employed in 31 business establishments, the usual public services, and on nearby farms. Forty-eight of the families listed farming as their occupation. Thus, agriculture was the most important

source of direct employment for citizens of the town, and employment in other trades and services depended almost wholly upon agricultural income in the trade area. The Kentucky reservoir threatened to flood about one-third of the town containing 25 business establishments, 65 dwellings, and the railroad station. Also about 23 percent of the best agricultural land in the trade area would be suddenly and permanently lost by flooding. The town faced serious social and economic readjustments.

Following preliminary studies, four possible alternatives for protection and readjustment of the town were considered jointly by the townspeople and TVA: (1) purchase by the TVA of the entire town of Big Sandy, (2) purchase by the TVA of the flooded portion of the community, (3) partial protection of the town from flooding, by means of a dike outside the community, or (4) complete protection of the town by diking. People in the town had sharp differences of opinion regarding which alternative to adopt. Some were anxious to take advantage of the opportunity to sell since Big Sandy had experienced economic decline during recent years, and further decline was anticipated. Others felt that there would be opportunities for improvement, or wished to keep the town intact for non-economic reasons. During the height of the controversy the town had two mayors, representing the two dominant factions.

At this stage TVA requested the Agricultural Extension Service to make a study to determine the loss in agricultural production and the potential production possibilities on the remaining non-flooded uplands. The study was made by taking a survey of farms in the area, and through use of soil maps, type-of-farming maps, contour maps, records on test-demonstration farms, and other relevant data. Progress made on test-demonstration farms in the several resource areas of the trade area during the past five to eight years provided a basis for estimating potential argicultural development.

The study indicated that about 36 percent of the agricultural production in the trade area would be lost immediately after flooding. Potential production within ten years was estimated to be 95 percent of production before flooding, provided farmers in general could make adjustments at one-half the rate on representative test-demonstration farms. This appraisal, considerations of the social and physical adjustments which would be required, the relative costs to TVA, TVA's responsibility and moral obligations, and the wishes of the people of the town were taken into account in selecting the alternative of complete protection of the town by diking. Except for acquisition of a few tracts on the outskirts of the town for the dike site, the town was left intact. Since this policy decision was partially

justified by assuming potential agricultural development as indicated by the study, TVA allocated additional funds to the Extension Service for personnel to carry out an expanded agricultural development program in the trade area of the town.

The agricultural development program was based on the study, which in turn was based on demonstrated results obtained through collaboration between TVA and the Extension Service in the test-demonstration program. In addition to providing an example of how TVA made use of extension education in its water use and control activities, the Big Sandy story illustrates the relationship between problems stemming from water use and control on the main channels and test-demonstration work in agricultural development. During and for several years following the construction period, test-demonstration work was intensified in seriously affected communities such as Big Sandy in order to speed up agricultural adjustments.

EXAMPLE OF EDUCATIONAL ACTIVITIES IN CONNECTION WITH WATER USE AND CONTROL

Basic in the work on water use and control in the Tennessee Valley are the policies and principles set forth in the "Contract for Joint Program of Agricultural Development and Watershed Protection Through Improved Fertilization" between TVA and the land-grant colleges. While the use of fertilizers is emphasized, it is only one of several measures included in a broad program of watershed protection and agricultural development. The following excerpt from the contract explains the basic concept in this broad program:

> Whereas, in promoting the further purpose stated in said Act (the Tennessee Valley Authority Act of 1933) respecting the improvement of navigation in the Tennessee River and the control of destructive flood waters in the Tennessee and Mississippi Rivers, Authority finds both necessary and appropriate thereto the adoption of broad measures to reduce the run-off of soil and water in agricultural areas now resulting in the destructive silting of stream channels and navigation facilities therein, and the concentration of flood waters, which measures of watershed protection are co-extensive with those of *agricultural development* through the use of improved soil tillage, improved crops and cropping systems, new forms of plant foods, and improved methods of fertilization; . . .

Under this master contract and supplementary projects, educational work has been concentrated on the following: (1) the use of fertilizers in establishing and maintaining soil-protecting crops, (2) mechanical measures of water control and soil conservation, (3) reforestation and woodland management, and (4) improvement of farm income in systems of farming consistent with watershed protection. These component factors in watershed protection and agricultural development have been brought into optimum relation-

ship. These test-demonstration farms have served as fact finding laboratories for measuring the effect of innovations in watershed protection and agricultural development. The demonstrated results have provided the basis for educational work on watershed protection and agricultural development among farmers in general.

Benton County, Tennessee, the county in which Big Sandy is located is representative of the counties seriously affected by the TVA program of water use and control. Benton County permanently lost about one-third of its total land area by flooding of the Kentucky reservoir. The land lost was above average in productivity.

The unit test-demonstration farms are selected by the people in the various communities and are representative of the various types of farming, soils, and sizes of farms found in the county. A total of 92 unit test-demonstration farms have been approved. Each unit test-demonstration farmer and homemaker undertakes to develop a sound system of farming, including soil conservation, adequate use of minerals, high quality sod crops, livestock, and improved family living. Farm and home plans are developed by the farmers and homemakers with the assistance of the farm and home demonstration agents. These farms serve their communities in testing and measuring the results of adequate use of minerals in sound systems of farming. Wide use has been made of them in teaching better methods of farming. Any farmer in the county can visit and study the results on a test-demonstration farm similar in soils, size, and type to his own and use the results in planning his own farm. Many have used these farms as guides in planning adjustments in their farming operations and in making best use of the services of agricultural agencies.

Area test demonstrations have been established in eleven communities which include 376 participating farmers, who have used test-demonstration materials in developing crop rotation plans. The area demonstrations are selected by the Soil Erosion Control Association in cooperation with the people in the communities and are set up to help groups of farmers accomplish what has been found to be sound and practical on the unit farms. They serve as demonstrations for the other communities of the county.

In addition to the technical assistance provided by the Tennessee Valley Authority through the Agricultural Extension Service, these 468 unit and area test-demonstration farms have received 2,200 tons of high analysis phosphate to assist them in establishing better systems of farming. According to latest census figures, Benton County has a total of 1,018 farm units. Thus, 46 percent of the farm units in the

county have participated directly in the test-demonstration program, either as unit or area demonstrators using test-demonstration materials. Educational material based on test-demonstration farms has been presented to all farmers in the county through tours, individual farm visits, visual aids, meetings, and newspaper articles. This means that with very few exceptions, every farm in the county has benefited directly or indirectly through the education program developed on test-demonstration farms.

Since the test-demonstration work is a part of the over-all program of the Agricultural Extension Service, the subject matter specialist has assisted in all phases of farm and home development. This service has been especially helpful since development of test-demonstration farms is not limited to soil conservation, but includes development of the whole farm and home.

In addition to the test-demonstration farms, following are some of the more important activities resulting from TVA assistance in developing the agricultural program in Benton County:

1. The Tennessee Valley Authority supplied 4,819,200 tree seedlings, which were planted on 975 farms. These trees were planted on 4,016 acres of eroded land.

2. A detailed soil survey of the entire county has been completed cooperatively by the Tennessee Valley Authority and the Agricultural Experiment Station of the University of Tennessee. This information is available to the farmers of the county for their guidance in planning proper land use. This soil survey together with other data on agricultural resources and findings on test-demonstration farms, has been used in making an agricultural study of the county to determine the potential agricultural development. This study has been of great assistance to the Program Planning Committee in developing a long-time agricultural program.

3. The association of unit and area test-demonstration farmers purchased a power terracing outfit and operated it with the assistance of the county extension agents. Work with this power outfit served to demonstrate the value of terracing in soil erosion control. After demonstrating the value of terracing, the outfit was sold to a private operator. These demonstrations have resulted in a continued demand for terracing, and the acreage terraced annually with the assistance of the county and assistant agents has been from 400 to 1,500 acres.

4. A full-time forester is assigned to Benton County in the cooperative work with the Tennessee Valley Authority. Since this intensive forestry work was started the reforestation of eroded land

has greatly increased and during the past two years 800,000 tree seedlings have been planted annually. Considerable progress has been made in timber stand improvement, and a market has been developed for low-grade timber, which heretofore has been worthless except for fuel wood. Assistance is given farmers in selective cutting and marketing of merchantable timber. A timber growers association is in the process of formation, and the members will agree to cut timber selectively for the next 20 years. Cooperators in this program are expected to realize approximately $3.00 per acre increase per year from their timber lands.

5. Assistance in finding new farms was given to 371 farm families directly affected by acquisition of land for the Kentucky reservoir. These families were helped in re-establishing their farming activities on the new farms. Several hundred other families who were affected by loss of part of their land, but who did not have to move, were assisted in adjusting to new farming conditions on the uplands. An additional assistant county agent and an additional assistant home agent were made available through TVA funds to assist families with relocation and adjustment problems.

6. In cooperation with the Tennessee Valley Authority and the United States Fish and Wildlife Service assistance was given in developing a wildlife refuge area on the border of Kentucky Lake. The Soil Erosion Control Association handled the land rental program in this area, whereby food is grown for migratory wild fowl and other wildlife. Provision is being made for demonstration plots of lespedeza bicolor for wildlife food.

7. During the adjustment period following the filling of the Kentucky reservoir the Soil Erosion Control Association handled the licensing of Tennessee Valley Authority owned lands in order to make the best use of this land in the adjustment of the agriculture of the county.

Since 1935, the soils of Benton County, have been improved; new crops such as white clover, red clover, improved permanent pasture, and other quality sod crops introduced; improved systems of farming developed; and agricultural income increased. The cash income in Benton County from crops and livestock in 1940 was $415,000 as compared with $857,000 in 1945, an increase of more than 100 percent. During this period prices of these products increased by about 90 percent. Since the increased income is not fully accounted for by price increases, the value of agricultural products sold in 1945 was somewhat greater than in 1940. This improvement has occurred during a period when Benton County lost approximately one-third of

its agricultural lands in the filling of the Kentucky reservoir. These accomplishments reflect what has been done through the cooperative planning and work of all the groups in the county and the agencies assisting in the agricultural development of Benton County.

THE DEVELOPMENT OF WATER CONTROL LEGISLATION IN TENNESSEE

1. Three successive years of drought (1952-54) in certain areas of the state stimulated interest in water use legislation. The scarcity of water developed a recognition of possible conflict between various user groups in certain areas. Various groups became concerned over the absence of state legislation in water use. Only court decisions based on riparian rights indicated the rights of individuals or companies in water use.

2. On March 31, 1954, the Tennessee Association of Soil Conservation District Supervisors called a meeting of representatives of public agencies and private groups interested in water use to discuss the problems and "establish machinery to develop a long-time water policy." One of the University of Tennessee Extension Service representatives was elected as chairman of a group concerned with broad issues of water use and control. Each major group of water users present was requested to select two representatives to serve on a committee to prepare a report for submittal to the governor and state legislature. This report was to include statements of water problems as viewed by the various user groups, a resume of the present status of water use legislation, and proposals for appointment of a Water Conservation Study Commission to make investigations and report to the 1957 legislature.

3. In August 1954, the chairman of the committee (the extension leader in test demonstration) prepared a public policy bulletin for use by Extension and Farm Bureau in public education on water use and control. This was used by county agents and discussion leaders in community meetings over the state, and by the Farm Bureau in sixteen policy meetings over the state.

4. Recently a committee of technically competent people was appointed by the legislature to study the state water use situation and to draft appropriate legislation.

This activity in water use and control illustrates the approach that has been taken in several matters of public interest where government action was needed or was under consideration. The steps involved were:

1. Agitation for government action by special interest groups.

2. Exchange of viewpoints by representatives of the various groups.

3. Formation of representative committees to study problems, resolve differences, make recommendations, and advise with responsible executive and legislative bodies.

4. Educational programs to improve the public understanding of the problems and issues involved.

5. Assignment of technically competent personnel to draft proposed legislation.